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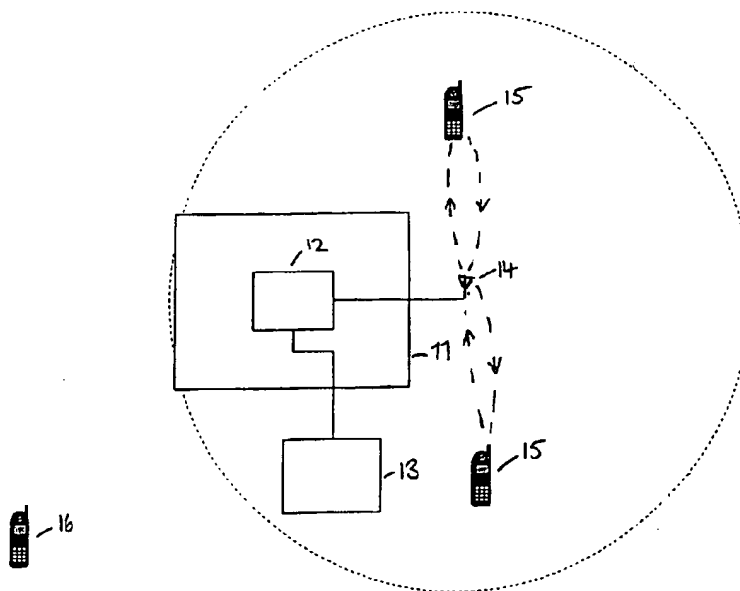
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(54) Title: AN INTERACTIVE DISPLAY SYSTEM



(57) Abstract: An interactive display system is provided comprising a display panel capable of displaying a number of different images and, detection means for determining the proximity of mobile communication devices to the display panel, wherein the mobile communication devices each have associated profile data, and the display panel displays a particular image in response to the profile data of a proximate mobile communication device. The display system allows image content on the display panel to be tailored to a particular person or persons in the vicinity.



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*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

## AN INTERACTIVE DISPLAY SYSTEM

## Field of the Invention

The present invention relates to advertising display  
5 panels.

## Background to the Invention

Advertising display panels are used in a variety of  
public places, such as bus shelters, petrol stations and  
10 train stations, usually in the form of posters or panelled  
billboards. Some of these displays have mechanisms which  
allow multiple images to be displayed by scrolling a  
continuous roll of images on a timed cycle. Similarly,  
advertisement panels formed by rotating slats, with a  
15 different image on each side of the slats are known.  
Electronic displays which display a digital image also have  
been used. The different images available on these  
electronic displays are stored in a memory in the display  
panel itself.

20 A great deal of research is carried out to determine  
where particular advertisements or groups of advertisements  
should be located in order to be most effective. An  
important factor in deciding where to place advertisements  
is how many of the target audience will actually be exposed  
25 to the advertisement at a particular location.

Whilst electronic display panels and mechanical  
scrolling mechanisms allow for different advertisements to  
be displayed at the same location at different times,  
typically changing advertisements on a set cycle, these  
30 displays are not responsive to a changing local environment  
i.e. a change in the type of people close to the display  
panel at any given time.

A further problem is that, in all of the above cases,  
if it is desired to change or add a particular image to the

images available at particular display panel then a person has to visit the site of the display panel in order to do so.

5           **Summary of the Invention**

According to a first aspect of the present invention, an interactive display system comprises:

a display panel capable of displaying a number of different images;

10           detection means for determining the proximity of mobile communication devices to the display panel,

wherein the mobile communication devices each have associated profile data, and the display panel displays a particular image in response to a data profile associated  
15           with a proximate mobile communication device.

The present invention allows advertisements which are tailored to a particular socio-economic group to be displayed when one or more members of that group is close to the display panel. The data profile preferably contains  
20           information about the purchasing habits of the user. This means that advertisements for products of the type which nearby users are known to purchase can be displayed. Alternatively or additionally the data profile can be  
25           indicative of the type of mobile device, which is itself indicative of the user.

Preferably, an interactive display system further comprises:

an image receiving means connected to the display panel for receiving image data from a remote source over a  
30           cellular network; and,

a transmitting means for transmitting image data from an image store to the image receiving means.

The present invention allows a new image to be displayed on one or a number of different image display panels

without the need for an operator to visit the site of each display panel. This allows for numerous predetermined display programmes to be implemented cheaply and efficiently. For example, different images can be displayed  
5 at different times of day or a series of related images could be displayed on a single display panel, a new image being displayed each day of the week.

Cellular technology allows the location of cellular telephones within a cellular network to be known. The cell  
10 in which a telephone is located is easily ascertained. More complex techniques using triangulation allow the location of a telephone within a cellular system to be known more accurately. The location of a stationary advertising display panel within a cellular network is  
15 known and therefore it is possible to ascertain the proximity of particular cellular telephones to particular advertising display panels.

Each cellular telephone typically has a data profile corresponding to its owner or its type, either stored on  
20 the telephone itself or in a central database. In one example, the detection means for determining the proximity of mobile communication devices to the display panel is a means for determining the proximity of cellular telephones to the display panel in a cellular network. In this example  
25 the profile data is stored in a central database. In another example, the detection means for determining the proximity of mobile communication devices to the display panel is a Bluetooth system.

Bluetooth is a universal short-range radio technology  
30 that can be used to provide customer premises wireless links for voice, data and multimedia applications. Bluetooth technology allows for the replacement of the many proprietary cables that connect one device with another. For instance, Bluetooth radio technology built into both a

cellular telephone and a laptop would replace the cumbersome cable used to connect them. Printers, PDAs, desktops, fax machines, keyboards, joysticks and virtually any other digital device can be part of a Bluetooth system.

5 Bluetooth provides an interface with existing data networks and a mechanism to form small, private ad hoc groupings of connected devices away from fixed network infrastructures. Bluetooth technology enables high-speed communication between devices that are within 10 metres of each other.

10 This distance can be increased to 100 metres with amplifiers or by increasing the transmission power.

Bluetooth radios operate in the unlicensed ISM (Industrial, Scientific and Medical) radio-band at 2.4GHz. The radio-band is available for worldwide use without

15 licence. Designed to operate in a noisy radio frequency environment, the Bluetooth radio uses a fast acknowledgement and frequency hopping scheme to make the link robust. Bluetooth radio modules can be arranged in a group called a piconet, one of which is the piconet master

20 and the others are slaves.

A single blue tooth radio can support asynchronous data channels, up to three simultaneous synchronous voice channels, or a channel which simultaneously supports asynchronous data and synchronous voice. The asynchronous

25 channel can support an asymmetric link of maximally 721 kb/s in either direction while permitting 57.6 kb/s in the return direction, or a 432,6 kb/s symmetric link. Many Bluetooth radios can operate in the same space and using different radio hopping sequences delivering aggregate

30 delivery rates of over 6 Mb/s.

A full specification of the Bluetooth standard is available from the Bluetooth Special Interest Group (SIG).

Preferably, the Bluetooth system comprises a Bluetooth radio which is able to form data links with other Bluetooth

enabled devices, having associated data profiles, when the other devices are within range of the Bluetooth radio.

Preferably, the display panel is adapted to display a particular image in response to the data profile associated with a Bluetooth enabled device which has formed  
5 a link with the Bluetooth radio.

Preferably, the Bluetooth data link transmits SIM card details to the display panel.

According to second aspect of the present invention,  
10 an interactive display system comprises:

- a display panel capable of displaying a number of different images;

- a Bluetooth radio able to form data links with other Bluetooth enabled devices;

- 15 a display controller for selecting a particular image to be displayed; and,

- an image store,

- wherein the display controller selects an image for display from the image store based on one or more data  
20 profiles received by the Bluetooth radio from other Bluetooth enabled devices.

When a Bluetooth enabled electronic device, containing a data profile, enters within range of the Bluetooth radio in the display panel, a connection between the electronic device and the Bluetooth radio in the display panel is  
25 established. The data profile is transmitted from the electronic device to the display panel. The display controller receives the profile data and selects an appropriate image based on the profile data. The user of  
30 the Bluetooth enabled electronic device may request further information about the image on display to be sent to the electronic device via the Bluetooth link.

If more than one Bluetooth enabled electronic device is within range of the Bluetooth radio in the display panel

then the image that is to be displayed may be determined on a predetermined hierarchical basis, either based on the profile data or on the images.

5           **Brief Description of the Drawings**

Examples of the present invention will now be described in detail with reference to the accompanying drawings, in which:

Figure 1 is a schematic diagram of an advertising  
10 system according to a first aspect of the present invention; and

Figure 2 is a schematic diagram of an advertising system according to a second aspect of the present invention.

15

**Detailed Description**

Figure 1 shows a system according to a first aspect of the present invention, which uses cellular technology. A display panel 1 has an image receiving means 6 which is  
20 part of a cellular network. A central image store 8 which is connected to a display controller 2 is connected in turn to an image transmitting means 7. The image transmitting means also forms part of a cellular network and transmits image data to the receiving means 6 so that the image on  
25 the display panel 1 can be altered remotely.

A cellular telephone 5, carried by a user, is in communication with a base station containing a location determining means 4. The location determining means is connected to a profile database 3 and the display  
30 controller 2.

The location determining means 4 determines the location of cellular telephones in a cellular network according to known techniques. The location of advertisement display panels are stored in the location

determining means so that the location of cellular telephones can be compared with the location of the advertising display panels and when a cellular telephone enters within a certain range of a display panel profile data for that cellular telephone is sent to the display controller 2 from the database 3. The display controller 2 then selects an image to be displayed at the display panel 1 from the image store 8 based on the profile data, and sends appropriate image data to the display panel 1.

10 If more than one cellular telephone, each with a respective data profile, is found to be in range of a particular display panel then image to be displayed is determined by distance from the display panel or hierarchically based on profile data or the available  
15 images themselves.

Figure 2 shows a system according to a second aspect of the present invention, using Bluetooth technology. A display panel 11 is provided with a Bluetooth radio 14 having a range of 10 metres. Up to seven other Bluetooth  
20 devices 15 entering an area within 10m of Bluetooth radio 14 are able to set up a link with the Bluetooth radio 14, to form a piconet. Devices 16 outside this range cannot form a link with Bluetooth radio 14. Data profiles stored on these other Bluetooth devices 15 are transmitted to and  
25 received by the Bluetooth radio 14. The profile data is processed at a display panel controller 12. The display panel controller 12 selects an image for display from an image store in response to the data profile that it receives. A image schedule recorder 13, for recording the  
30 time for which each image in the image store is displayed, is connected to the controller 12. The link is continuously established until the Bluetooth device 15 is out of range. the image on the display panel remains on display until another Bluetooth device 15 establishes a link. The image

for display is then determined according to the new received data profile as before.

When more than one Bluetooth enabled device 15 enters the range of Bluetooth radio 14, and hence more than one data profile is received by the display controller 12, the display controller selects an advertisement matched to one of the data profiles, giving priority based on a premium paid by the advertisers. Alternatively, the display controller selects one set of data profiles and displays an image on the basis of the chosen data. The choice of data profile is made based on ranking information contained in the profile data. A predetermined number of criteria are used to assign an individual to a "consumer class" so that adverts directed to individuals considered to be high spenders are given priority.

The display panel 11 also contains a data store holding further information about the products and services advertised. A user of a Bluetooth enabled device which is within range of the Bluetooth radio 14 can request further information about the product or service displayed to be sent from the data store via the Bluetooth link to his or her device.

Claims

1. An interactive display system comprising:  
a display panel capable of displaying a number of  
5 different images; and,  
detection means for determining the proximity of  
mobile communication devices to the display panel,  
wherein the mobile communication devices each have  
associated profile data, and the display panel displays a  
10 particular image in response to the profile data of a  
proximate mobile communication device.
2. An interactive display system according to claim 1,  
wherein the profile data contains information about the  
15 purchasing habits of a user.
3. An interactive display system according to claim 1 or  
2, wherein the profile data includes the type of mobile  
communication device.
- 20 4. An interactive display system according to claim 1, 2  
or 3, wherein the profile data is stored in a central  
database.
- 25 5. An interactive display system according to any one of  
the preceding claims, further comprising:  
an image receiving means for receiving image  
information from a remote source using a cellular network,  
connected to the display panel; and,  
30 a transmitting means for transmitting image  
information from an image store to the image receiving  
means.

6. An interactive display system according to any one of the preceding claims, wherein the detection means for determining the proximity of mobile communication devices to the display panel is a means for determining the proximity of cellular telephones to the display panel in a cellular network.

7. An interactive display system according to any one of claims 1 to 5, wherein the detection means for determining the proximity of mobile communication devices to the display panel is a Bluetooth system.

8. An interactive display system according to claim 7, wherein the Bluetooth system comprises a Bluetooth radio which is able to form data links with other Bluetooth enabled devices having associated profile data, when the other devices are within a certain distance of the Bluetooth radio, and

the display panel is adapted to display a particular image in response to the profile data associated with a Bluetooth enabled device which has formed a link with the Bluetooth radio.

9. An interactive display system according to claim 8, wherein the Bluetooth data link transmits SIM card details to the display panel and a particular data profile associated with each SIM card is stored in a central database.

10. An interactive display system comprising:  
a display panel capable of displaying a number of different images;  
a Bluetooth radio able to form data links with other Bluetooth enabled devices;

11

a display controller for selecting a particular image to be displayed; and

an image store,

wherein the other Bluetooth enabled devices each have  
5 an associated set of profile data which is transmitted to the Bluetooth radio when a data link has been formed, and

wherein the display controller selects an image for display from the image store based on profile data received by the Bluetooth radio.

10

11. An interactive display system according to claim 10, wherein a user of the Bluetooth enabled electronic device may request further information about the image on display to be sent to the electronic device via the Bluetooth link.

15

12. An interactive display system according to claim 10 or 11, wherein if more than one Bluetooth enabled electronic device is within range of the Bluetooth radio in the display panel then the image that is to be displayed is  
20 determined on a predetermined hierarchical basis, either based on the profile data or on the images.

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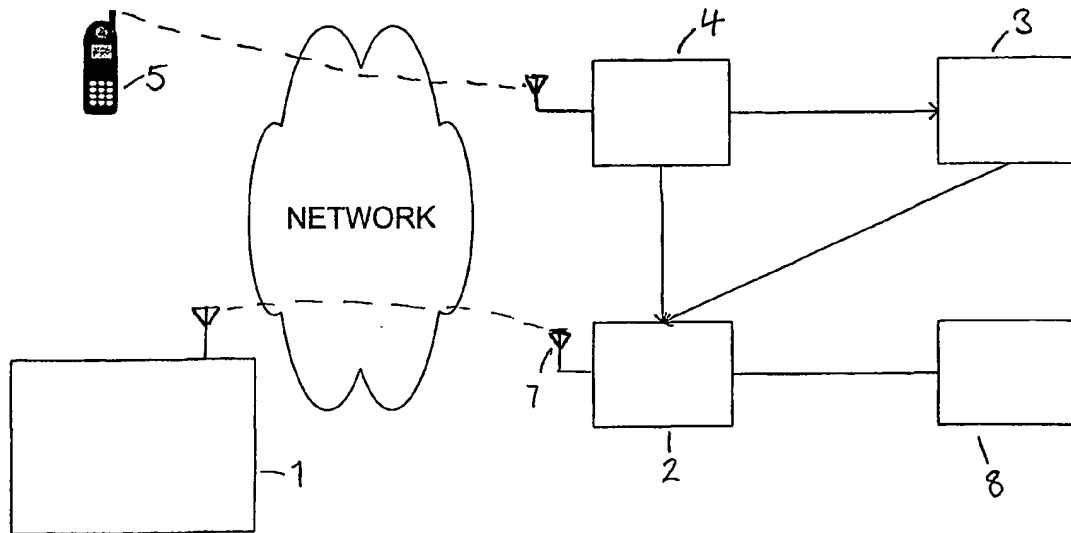


Figure 1

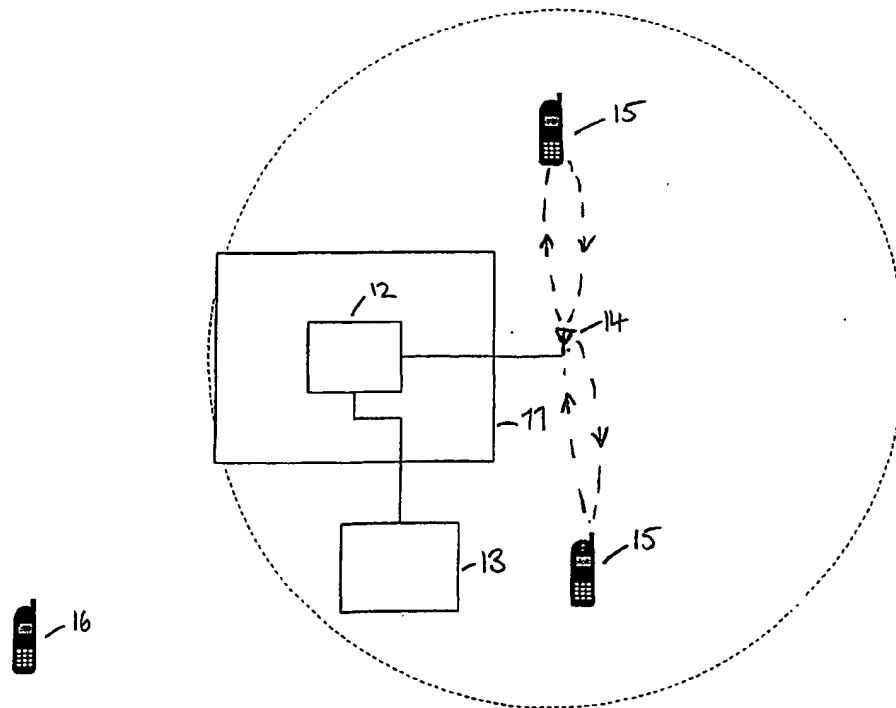


Figure 2

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/GB 02/00872

## A. CLASSIFICATION OF SUBJECT MATTER

IPC7: G06F 17/60, H04Q 7/38

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: G06F, H04Q

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 0070504 A2 (HERZ, F.), 23 November 2000 (23.11.00), page 1, line 24 - page 2, line 22; page 6, line 9 - line 25, claims 1-6, abstract --	1-12
A	US 6091956 A (HOLLENBERG, D.D.), 18 July 2000 (18.07.00) --	1-12
A	US 5966696 A (GIRAUD, S.G.), 12 October 1999 (12.10.99) --	1-12



Further documents are listed in the continuation of Box C.



See patent family annex.

\*

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document defining the general state of the art which is not considered to be of particular relevance

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"P"

document published prior to the international filing date but later than the priority date claimed

"T"

later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X"

document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y"

document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

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document member of the same patent family


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## INTERNATIONAL SEARCH REPORT

International application No.

PCT/GB 02/00872

## C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 0035216 A1 (SPOTCAST COMMUNICATIONS, INC), 15 June 2000 (15.06.00)  -- -----	1-12

**INTERNATIONAL SEARCH REPORT**  
Information on patent family members

01/05/02

International application No.  
PCT/GB 02/00872

Patent document cited in search report			Publication date	Patent family member(s)		Publication date
WO	0070504	A2	23/11/00	AU	5033700 A	05/12/00
US	6091956	A	18/07/00	NONE		
US	5966696	A	12/10/99	NONE		
WO	0035216	A1	15/06/00	AU	1820399 A	26/06/00
				EP	1135939 A	26/09/01